



United States Patent Application

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[a) No other such application has been filed b) This work has not been sponsored]

Linear Motion Wind Driven Power Generator

Background of the Invention

As the populations of nations, their industrialization and other needs of individuals increase, so does the need to provide alternative sources of energy. Available sources are from wind, from wave, from tide or from solar energy. These are renewable sources which also reduce or completely eliminate harmful pollutants or other by-products which can affect the environment adversely.

The present invention addresses the need for the development of such devices which can be comparatively simple to install and operate and which can safely and efficiently extract energy from the winds.

Prior Art

The familiar wind-mill on top of a tower has been used for the production of mechanical as well as electrical power. Later versions have reduced the number of radially extending vanes or sails to three or two with more efficient design so as to capture the force of the wind more

efficiently. Progressively, designs of wind-driven power generators fell in the category of wind-turbines where greater wind masses were captured by wind-scoops having a large opening so that at the point of impact of the wind with the vanes or blades of the apparatus, the increased wind velocity resulted in increased power output.

Recently, in US Patent 6,113,350 issued to Liu, and in US Patent 4,168,439 issued to Palma, wind-driven apparatus was described where a plurality of blades (sails) were suspended at the periphery of vertical axle rotatable rings. In US Patent 5,758,911 issued to Gerhardt, a linear motion wind driven power plant was described where a number of sails are connected to carriages which in turn move linearly on a closed loop track bed. At least one electrical power generator generates electrical power from said movement of the carriages. The function of this apparatus as further described in the afore-mentioned reference, depends on sensing the lift generated by the wind upon the sail and on a controller which causes the sail to turn to a position wherein the sensed lift of the sail is approximately maximized.

It is noteworthy that in the above reference various other references to issued US Patents as well as to Foreign Patents dealing with linear motion wind-driven power plants are cited, none of which discloses prior art even in the least predating the concept of the present invention.

Description of the present invention

The present invention relates generally to wind-driven power generators; it relates particularly to a novel wind-driven power-generating apparatus which can capture the power of

the wind at high efficiencies. A unique feature of the apparatus of the instant invention is the motion of its sails. This motion is linear, and can be in a horizontal or in a "vertical" direction. It is understood that the apparatus where the sails move in a "vertical" direction, may actually be moving in a direction variably inclined from vertical by the automatic repositioning of the apparatus so as to adjust to the force of the wind, as will be described. Automatic or manual adjustment of the apparatus operating with the sails moving in a horizontal direction may be accomplished by installing said apparatus on a turn-table as will also become obvious from the detailed description that follows.

It is noteworthy that the apparatus of the present invention, as a result of its design, presents a large cross-section to the on-coming wind and thus is capable of producing comparatively large amounts of electrical power when compared to propeller-type wind mills, or to the linear motion power plant described in USP 5,758,911, or those which employ air entrance nozzles to increase air velocity before said air impinges onto turbine-type blades to affect rotation of the turbine shaft (US Pat. Nos. 4,164,382, 1,002,833 and 757,800 as examples). All these prior art devices present a low ratio of sail area to overall cross-section of the rotating member of the device.

The apparatus of the present invention not only presents a high sail area to its total cross-sectional area, but also permits each of its sails or vanes to capture the unobstructed full force of the wind twice in each revolution around the track, as will become evident from the description that follows.